Techniques to Improve Calcein Marking of Fish

Chemical marking provides a mechanism for identifying hatchery fish in stocking programs. Calcein has advantages over other chemicals. We examined salinities for the osmotic induction of White Crappie and Black Crappie. Experiments consisted of a 3.5-min immersion of five fish in 1 L of solution at salinities ranging from <1 to 50 ppt. Immediate and 24-h mortalities were 0% and 0—13%, respectively for Black Crappie.

Similarly, immediate and 24-h mortalities were 0% and 0—27%, respectively for White Crappie. We examined dunking density (kg of fish/L) to maximize efficiency during the marking process. Fish were confined at densities ranging from 0.016-0.250 kg/L in 1L of water for 7 min. Immediate and 24-h mortalities were 0% and 0—3%, respectively for Black Crappie and 4—23% and 8—23%, respectively for White Crappie. Ninety-six thousand Black Crappie and eighty-six thousand White Crappie were calcein marked during fall 2015 at 40 ppt and 0.25 kg/L. The process took between 7 and 10 h to mark each species. Twenty four hour survival of Calcein-marked Black Crappie and White Crappie was 99.5% and 99.6%, respectively. Our calcein marking process is scalable and could be used by natural resource agencies.

Distribution and Abundance of the Strawberry darter (*Etheostoma fragi*) in the Main Stem and Tributaries of the Strawberry River

The Strawberry Darter (*Etheostoma fragi* Distler 1967) was identified as a species of greatest conservation need in the Arkansas Wildlife Action Plan. The Strawberry Darter is endemic to the Strawberry River drainage and was recently elevated from the subspecies to the species level. Surveys were conducted during the summers of 2015 and 2016. Sixty-four (32 each summer) sites were sampled within the Strawberry River drainage, 32 on the main stem and 32 on tributaries. Sites were surveyed 4 times each throughout each summer using a kick-seine. Habitat characterization was done at each site and environmental variables were measured at each site, i.e. dissolved oxygen, pH, and water depth. A total of 236 *E. fragi* were encountered during both summers. *E. fragi* were observed at 24 of 64 sites, including 15 tributary sites and 9 main stem sites. Data was analyzed using the software Presence, which estimates occupancy rate and probability of detection. A drainage-wide occupancy rate was estimated to be (mean± standard error) 0.41 ±0.06 and a probability of detection was estimated to be 0.56 ±0.06. Site type (mainstem, tributary) was used in a second model, where occupancy of 0.30 ±0.09 and a probability of detection of 0.49 ±0.09 for main

stem sites were estimated. At tributary sites, occupancy of 0.51 ±0.09 and a probability of detection of 0.60 ±0.06 were estimated. Occupancy rate appears to be higher in tributaries than the main stem. Compared to an occupancy rate based on historical data (0.73 ±0.11), the current occupancy (0.41 ±0.06) appears to be lower.

Assessing Arkansas Game and Fish Commission Crappie Stock Enhancement

Chemical marking provides a mechanism for identifying hatchery fish in stocking programs. Calcein has advantages over other chemicals. Ninety-six thousand Black Crappie and eighty-six thousand White Crappie were calcein marked during fall 2015 at 40 ppt and 0.25 kg/L. Twenty four hour survival of Calcein-marked Black Crappie and White Crappie was 99.5% and 99.6%, respectively. Stocking contribution calculated from trap net efforts for Black Crappies at age 1 ranged from 3.0-4.0%, and 0.6-100% at age 1 for White Crappies.

Population Characteristics, Diet and Movement of Northern Snakeheads

Arkansas is one of six states in the U.S. that have an established population of the invasive Northern Snakehead. The goal of this project is to assess the population of Northern Snakeheads in eastern Arkansas. This project would study the vital rates and populations characteristics of Northern Snakeheads. This project will also examine the diet of Northern Snakeheads. In addition, the project will examine Northern Snakehead movement and macrohabitat usage. Individuals will be captured, implanted with a radio telemetry tag and monitored on multiple time scales. These data will provide insights into population dynamics and basic life history and will inform future management decisions regarding this invasive exotic fish species.